

# Flexible Ablative Aerogel TPS Materials for Planetary Aerocapture and Entry, Phase I

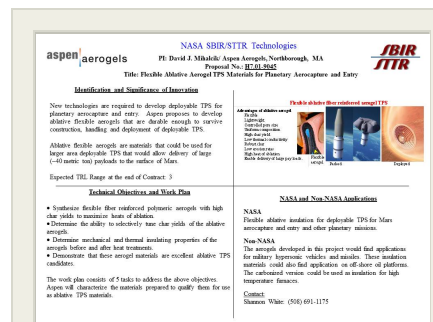
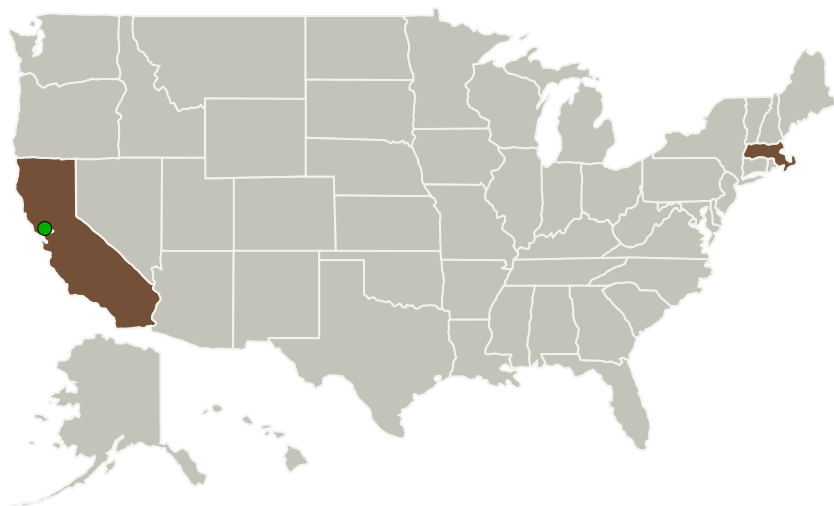
Completed Technology Project (2013 - 2013)



## Project Introduction

Renewed interest in missions to explore other planets has created a need for higher performance thermal protection systems (TPS) capable of shielding spacecraft from the severe heating encountered during hypersonic flight through planetary atmospheres. Additional advances in the robustness, reliability, and survivability of single and dual heating exposures are desired while maintaining mass and thickness requirements. The ability to decelerate high-mass entry vehicles relies on flexible or deployable aeroshells which offer an approach for achieving larger aeroshell surface areas than otherwise attainable. A flexible TPS is required that is capable of surviving reasonably high heat flux and durable enough to survive the rigors of construction, handling, and deployment. Aspen Aerogels proposes to develop improved flexible ablative reinforced polymeric aerogels to meet this challenge. During Phase I we will optimize the preparation methods to reduce thermal conductivity and increase flexibility and conduct a complete study of the aerogels' properties and capabilities. The technology readiness level will progress from 2 to 3 during Phase 1. Successful completion of a Phase II program will result in an optimized and scalable formulation for the aerogel component of flexible TPS and performance data which will be available for further commercialization efforts for the aerospace industry.

## Primary U.S. Work Locations and Key Partners



## Flexible Ablative Aerogel TPS Materials for Planetary Aerocapture and Entry

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Organizations Performing Work	Role	Type	Location
Aspen Aerogels, Inc.	Lead Organization	Industry	Northborough, Massachusetts
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Massachusetts

## Project Transitions



**May 2013:** Project Start

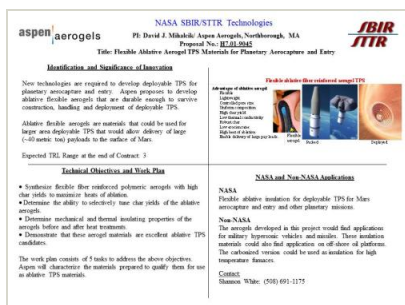


**November 2013:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138165>)

## Images



## Project Image

Flexible Ablative Aerogel TPS Materials for Planetary Aerocapture and Entry  
(<https://techport.nasa.gov/image/127996>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Aspen Aerogels, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

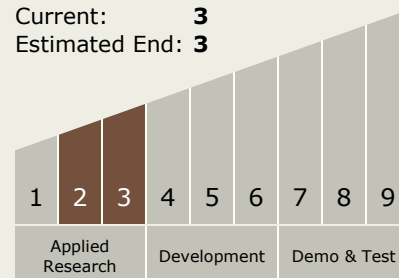
Carlos Torrez

### Principal Investigator:

David J Mihalcik

## Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



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## Technology Areas

### Primary:

- TX09 Entry, Descent, and Landing
  - └ TX09.1 Aeroassist and Atmospheric Entry
    - └ TX09.1.1 Thermal Protection Systems

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System